Congressional Notification Profile

DEEP TREK PROGRAM SOLICITATION

APS TECHNOLOGY, INC.

Background and Technical Information: Research entitled "Drilling Vibration Monitoring & Control System."

This project plans to develop a two-component system that monitors and controls drilling vibrations in smart drilling technologies. Drillstring vibration causes premature failure of equipment that reduces the depth and speed at which a well is drilled. A multi-axis active damper will be used to minimize harmful vibrations that will extend the life of the drill bit and other components and improve the rate of penetration. A real-time system that monitors 3-axis vibrations and related measurements will be used to assess the vibration environment and adjust the damper accordingly.

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Congressional District: 1st District County: Middlesex

Financial Information:

Length of Contract (months): 48 months
Government Share: $ 1,363,646
Total value of contract: $ 2,244,697

DOE Funding Breakdown:
Funds: Phase 1 $ 392,294
Funds: Phase 2 $ 478,977
Funds: Phase 3 $ 492,375

Public Abstract
Drilling Vibration Monitoring & Control System
APS Technology, Inc.

The drilling environment, and especially deep hard rock drilling, induces severe vibrations into the drillstring. The result of drillstring vibration is premature failure of the equipment and reduced ROP, The only means of controlling vibration for a given bottom hole assembly with current monitoring technology is to change either the rotary speed or the weight on bit (WOB). Changes of the rotary speed and/or WOB to reduce vibration are often achieved at the expense of drilling efficiency.

APS Technology proposes to develop a unique system (DVMCS) to both monitor and control drilling vibrations in a smart drilling system. This system has two primary elements: The first is a unique, multi-axis active vibration damper to minimize harmful axial, lateral and torsional vibrations, and thereby increase both rate of penetration (ROP) and bit life, as well that the life of
other drillstring components. The hydraulic impedance (hardness) of this damper will be continuously adjusted using unique technology that is robust, fast-acting and reliable.
The second component is a real-time system to monitor 3-axis drillstring vibration, and related parameters including weight- and torque-on-bit (TOB) and temperature. This monitor will determine the current vibration environment and adjust the damper accordingly. In some con-figurations, it may also send diagnostic information to the surface via real-time telemetry.

The ability to actively monitor and control the drilling vibration results in the following benefits:
- Increased ROP by keeping the bit in contact with the cutting surface.
- Increased bit life by eliminating shock and vibration damage.
- Increased downhole sensor life.
- Reduced number of trips needed to complete a well.

The above combine to provide reduced drilling costs and time to complete the well.
The broader benefits of extensive use of the DVMCS flow from its role in improving the economics of deep drilling for oil and gas. As our known reserves are developed, new sources are sought. These are generally either in remote geographic locations, at greater depths, or both. The primary determining factor in the choice of developing one of these new prospects vs. others overseas is economic. By reducing the financial investment and risk of developing deep domestic reserves, this technology will contribute to a reduction of our dependence on imported sources, thereby increasing our national security.